

Atty. Dkt. No. 033946-0301

**REMARKS**

The present invention relates to a novel Ziegler-Natta type catalyst for olefin polymerization, the preparation of such a catalyst, and the use of the catalyst for polymerizing olefins.

Claims 2-20 and 22-29 are pending. Claims 2, 9, 13, 15, 17, 22 and 23 have been amended and new claims 27-29 added. Claims 1 and 21 have been cancelled. Claims 5-9 and 15 have been indicated as allowable if rewritten. Claim 16 has been indicated as allowable as written. No amendments have been made to obviate the prior art or to overcome a rejection for patentability.

Claims 2, 9, 15, 17, 22, and 23 have been amended to provide better understanding by the Examiner. Specifically, claim 2 has been amended to incorporate the subject matter of claim 1. Further, claim 2 has been amended to include the feature that at least one of the bridging atoms is a chiral center. Support for this amendment is found in the specification at p. 6, lines 14-18, and from p. 15, line 28 to p. 16, line 2.

Claims 17-26 have been initially withdrawn from consideration by the Examiner. Withdrawn claims 17, 22 and 23 have been amended herein for purposes of rejoinder in accordance with MPEP § 821.04. Accordingly, the amendments and new claims are supported by the application and raise no issue of new matter.

Applicant notes that claims 1-4 and 10-14 were rejected over prior art. Claims 5-9 and 15 have been rejected only for indefiniteness and are thus free from the prior art. Claim 16 has been indicated to be allowable.

**Restriction Requirement**

This communication is responsive to a Restriction Requirement mailed March 15, 2005.

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The claims have been restricted into three groups. Although it is believed that such restriction is unwarranted and unfair, Applicant nevertheless hereby confirms the provisional election, with traverse, of Group I, Claims 1-16, for examination.

Applicant respectfully requests that the examiner rejoin the pending process of making a catalyst (Group II, claims 17-20) and polymerization process (Group III, claims 21-26) with the claims of Group I now that allowable subject matter has been indicated for Group I claims. See MPEP § 821.04. Claims 17, 22 and 23 have been amended for purposes of rejoinder in accordance with MPEP § 821.04. Applicant notes that new claims 27-29 would appear to belong to Group II.

**Rejection under 35 U.S.C. §112, Second Paragraph**

The claims have been variously rejected for allegedly being indefinite under 35 U.S.C. §112, Second Paragraph. Reconsideration of the rejection is respectfully requested in view of the amendments and arguments below.

**Claim 1:** The rejection of claim 1 has been rendered moot by the Applicant's cancellation of the claim.

**Claim 2.** The Examiner alleges that the term "o-alkyl" does not make it clear that "o" refers to oxygen. Although Applicant does not agree, this term, along with n-alkyl, now includes the letters in large case.

**Claim 9.** The claim has been amended as suggested by the Examiner.

**Claim 13.** The claim has been amended as suggested by the Examiner.

**Claim 15:** The Examiner alleges that the term "o-alkyl" does not make it clear that "o" refers to oxygen. Although Applicant does not agree, this term, along with n-alkyl, now includes the letters in large case.

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**Rejection under 35 U.S.C. §103(a)****a) Relevant Law**

To establish a *prima facie* case of obviousness, three criteria must be met; there must be some motivation or suggestion, either in the cited publications or in knowledge available to one skilled in the art, to modify or combine the cited publications; there must be a reasonable expectation of success in combining the publications to achieve the claimed invention; and the publications must teach or suggest all of the claim limitations. *In re Vaeck*, 20 USPQ2d 1438 (Fed. Cir. 1991); MPEP § 2142. In analyzing obviousness, the Court of Appeals for the Federal Circuit has repeatedly cautioned that:

[t]he factual inquiry... must be based upon objective evidence of record.... [T]he best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references.... [P]articular findings must be made as to the reason the skilled artisan, with no knowledge of the claimed invention, would have selected these components for combination in the manner claimed.

*In re Sang-Su Lee*, 277 F.3d 1338, 1343 (Fed. Cir. 2002) (internal citations omitted).

**b) Rejection Over Zhu, et al. (Inorg. Chem. Comm., 4 (2001), 486-489.)**

Claims 1-4 and 10-14 have been rejected as allegedly being obvious over Zhu, et al. The rejection is respectfully traversed.

According to the Examiner, Zhu teaches the synthesis of metallacarborane complexes of zirconium and titanium. The Examiner makes note of the fact, however, that the CH<sub>2</sub> group bridging the NH and the carborane in Zhu does not comprise at least two carbon atoms. (See compounds (3) and (4) of Scheme 1, Zhu, et al., p. 488, wherein the CH<sub>2</sub> group bridging the NH and carborane consists of a single carbon atom). Furthermore, the Examiner states that the bridging group (CH<sub>2</sub>)<sub>x</sub>, wherein X is 2 or 3, is shown in Fig. 1 (see p. 488), and that it would

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have been obvious at the time of the invention to prepare metallocarborane complexes by replacing the  $\text{CH}_2$  bridging group with  $(\text{CH}_2)_x$ , wherein X is 2 or 3.

However, with respect to claims 2-4 and 10-14, Zhu does not teach that the group bridging the carborane and NH consists of two atoms. While the bridging group  $(\text{CH}_2)_x$ , wherein X is 2 or 3, is shown in Fig. 1, there is no suggestion or teaching to prepare catalysts which include titanium, zirconium, hafnium or tin from such compounds.

Further, Zhu does not teach or suggest that at least one of the bridging atoms is a chiral center. The chiral center, now recited in claim 2, is introduced in the molecular geometry to control the stereoselectivity of the reaction when preparing polymers. See p. 15, lines 28-30. There is no suggestion or teaching in Zhu that stereoselective control of polymerization reactions is desired, nor is there any suggestion or teaching of the introduction of a chiral center. The rejection is therefore without basis and should be withdrawn.

**c) Rejection Over Zhu, et al. in View of Hlatky (U.S. Pat. No. 6,245,706)**

Claims 1-4 and 10-14 have been rejected as allegedly being obvious over Zhu, et al., in view of Hlatky. The rejection is respectfully traversed.

According to the Examiner, Zhu teaches the synthesis of metallocarborane complexes of zirconium and titanium. The Examiner states that Zhu does not expressly teach that the Zr or Ti in the metallocarborane complex is bonded to a weak or non-coordinating anion. However, the Examiner turns to Hlatky for teaching that it is common practice to convert an anion such as chloride bonded to the metal in the catalyst to a weak or non-coordinating anion such as a borate anion, in order to increase the activity of the organometallic complex. The Examiner concludes by stating it would be obvious at the time of the invention to "react Zhu catalyst complex with Hlatky's borate cocatalyst in order to provide a complex catalyst with improved catalytic activities." (See Office Action).

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It is respectfully submitted that Zhu and Hlatky, taken separately or in combination, do not teach all of the elements of claims 2-4 and 10-14. Neither reference teaches or suggests that the group bridging the carborane and NH consists of two atoms nor does either reference teach or suggest that at least one of the bridging atoms is a chiral center.

Furthermore, there is no suggestion to combine the references, nor any reasonable expectation of success with respect to the reaction between Zhu catalyst complex with the Hlatky borate cocatalyst (as suggested by the Examiner, see Office Action) to produce a catalyst having a chiral center. Because each of the elements of claim 2 are not taught or suggested, and that evidence of motivation to combine and reasonable expectation of success are lacking, the rejection therefore fails to establish a *prima facie* case of obviousness. Accordingly, reconsideration and withdrawal of the rejection is respectfully requested.

### CONCLUSION

In view of the foregoing remarks, Applicant respectfully submits that the pending claims are in condition for allowance. The Examiner is encouraged to contact the undersigned at the telephone number listed below so that any unresolved issues may be resolved without the need for additional action and response thereto.

The Examiner is again reminded to comply with MPEP § 821.04 by examining the claims of Group II (claims 17-20; including new claims 27-29) and Group III (claims 21-26) following rejoinder with the Group I claims.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 50-0872. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 50-0872. If any extensions of time are needed for timely acceptance of papers

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submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 50-0872.

Respectfully submitted,

Date July 15, 2005By Barry Wilson

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